REMARKS

Claims 7-12 are pending in the application, with claim 7 being independent.

Claim 7 covers a threaded ring for threadedly engaging an externally threaded section of a spindle. The threaded ring comprises a one piece body having first and second body components 1 and 3, a gap 15 between the body components, an elastically flexible wall component 29 connecting the body components, and a plurality of set screws 31 to adjust the geometry of the gap by adjustment of the flexible wall. The first body component forms a set collar with a planar surface 11 at one end thereof extending in a radial plane relative to the body longitudinal axis. The second body component forms a retaining ring connected to the first body component and having a front surface 25. The gap 15 has a radially outer end 17. A first circumferential area 19 is on the first body component. A second cylindrical circumferential area 21 is on the second body component, and forms the flexible wall component. The second circumferential surface is spaced from the longitudinal axis by a distance less than the radial spacings of the first circumferential area and of the radially outer end of the gap from the longitudinal axis. The radially outer end 17 is spaced radially from the longitudinal axis by a distance less than the radial spacing of the first circumferential area from the longitudinal axis. The second circumferential area ends at an axial distance from the gap to define a dimension of the flexible wall component in an axial direction and extends from the front surface to the flexible wall component.

By forming the threaded ring in the manner, the ring has a simple construction that can be easily formed, while providing effective operation.

Claims 7-12 stand rejected under 35 U.S.C. § 103 as being unpatentable over German Patent No. 16 75 685 B to Spieth in view of U.S. Patent No. 609,144 to Goddin. The Spieth

patent is cited for a threaded ring having a first body 8 and a second body 9 with a gap 5 or 6 between them and with screws 10 providing an actuating means for adjusting the gap geometry. The Goddin patent is cited relative to the embodiment of Figs. 1 and 2 as disclosing a one-piece threaded ring having a first body part component A and a second body component B with a gap a and with the outer circumference of the second body part component being less than the outer circumference of the first body part component and the outer end of the gap. In support of the rejection, it is contended that it would be obvious to form the Spieth threaded ring in the shape disclosed for that shown for the Goddin lock nut in connection with Figures 1 and 2.

Further, in support of the rejection, the Spieth and Goddin patents are alleged to involve related subject matter making the combination obvious. Allegedly, the patents are not incompatible, and one of ordinary skill in the art would consider both patents to be related.

However, the Spieth threaded ring and the Goddin lock nut are so different in design, function, operation and purpose that it would not be obvious to use the Goddin shape on the Spieth threaded ring. If the two were combined as alleged, the Spieth fasteners 10 would be omitted such that that combination would not result in the claimed subject matter of claim 7.

Even before the Goddin nut is screwed on the threaded bolt, membrane b is permanently offset in the axial direction. This offset causes a pitch error between nut body A and locking element B. As a result of its greater rigidity (relative to membrane b), the threaded bolt forces its pitch onto the nut membrane system, i.e., membrane b is deflected by the amount of pitch offset. The resultant prestress force in the membrane increases the frictional moment of the thread, causing the locking effect of the Goddin nut. The user cannot influence the locking process of the Goddin nut. The locking process is initiated spontaneously by the system during assembly, and is maintained during disassembly until the threaded bolt is fully disengaged from locking

element B. To ensure locking, a rotatory relative movement between the nut and the threaded bolt must always have taken place.

The system of the Spieth patent is different, since no pitch offset exists between nut body 8 and locking element 9 in the loose state. By tightening straining screws 10 after assembly of ring nut 1 onto threaded bolt 2, the pitch offset between the threaded bodies can be influenced in a targeted manner according to requirements. The reverse sequence can be easily selected for disassembly.

The Goddin patent basically only describes a nut with an increased frictional moment of the thread. The Spieth solution not only offers an effective locking method, but also, by means of two-phase assembly, the clearance between the threaded bolt and the ring nut required for screwed connection can be eliminated by sensitive actuation of the individual straining screws. As a result, the coincidence of the Spieth ring nut axis with the threaded bolt axis is brought about and the axial runout precision of the frontal locating face of the ring nut is adjusted. Both Spieth measures are strictly necessary, for example, for precision spindles in machine tool building since even the smallest imbalances are inadmissible in such applications. Asymmetric bracing of the bearing system must be avoided by unequal radial location of the locking ring nut. In applications with particularly stringent precision requirements, the assembly process is monitored using applied dial indicators, and is correspondingly corrected with the help of the ring nut.

The amount of frictional moment of the thread of the Goddin nuts is faced by a critical conflict of objectives. On the one hand, the frictional moment of the thread must be as high as possible to ensure a high locking value, whereas too high a frictional moment drastically reduces the ease of the assembly and disassembly processes. Moreover, there is a high risk of thread

damage as a result of cold welding and abrasion effects. Since the frictional movement of the thread is a product of normal force, friction factor and thread diameter, there is a physical limit to the useful thread diameter for the Goddin nuts. This means that an acceptable ratio between the assembly moment and the required locking moment for the operation of the screwed connection can be expected for a Goddin nut for small thread diameters. In the case of larger thread diameters, for example, the bearing frictional moment occurring in operation of the antifriction bearing prestressed by the ring nut significantly exceeds the assembly moment that can be achieved by the fitter. Targeted prestressing of a bearing is also very difficult of impossible in the case of superposition of locking moment and prestress moment.

A person of ordinary skill in the art using a Goddin nut to produce smooth running would not attempt to eliminate the prestress force of membrane b (after all, if there were no prestress force, it would not be a Goddin patent) during assembly of the nut. One way to achieve this would be to eliminate the prestress using pressure screws. Once assembly is complete, the load on the pressure screws can be relieved such that the membrane recreates the locking moment through its own prestress force. In contrast, the Spieth screws act directly against each other in this case.

The divergence in the applications between Goddin and Spieth devices is also underlined by the differing designs of the active surfaces for assembly tools. While the Goddin patent only describes square and hexagon wrench surfaces, the Spieth ring nuts comprise a cylindrical surface of the outer diameter with radially arranged wrench bores for hook wrenches. Due to the width across corners, a wrench surface with n sides has a significantly larger interference contour on the external circumference than a circular cylinder surface. Cylindrical external surfaces therefore allow a more compact design and are thus very common in the field of drive

technology. The main motivation of the Spieth patent lies precisely in this compactness. Moreover, a larger number of radial bores distributed on the outer circumference can reduce the graduation for rotating the assembly wrench. For typical ring nut applications, due to the size and the existing interference contours, there are usually no suitable ratchet wrench tools available. Nevertheless, this allows assembly in conditions of restricted space with difficult accessibility. However, square and hexagon wrench surfaces are typical for general applications in connecting technology without increased space requirements.

Because of these differences, one of ordinary skill in the pertinent art would not find it obvious to modify the Spieth threaded ring in view of the Goddin nut, as proposed in the Office Action. Both the flexible wall of the Goddin patent and the screws of the Spieth patent draw the respective two parts together for locking. Thus, one of the screws and the flexible wall would be eliminated in an obvious combination of these two patents, if any.

In contrast, in the invention recited in claim 7, the elastically flexible wall component and set screws work in opposition to one another, with one biasing the body components apart and the other for forcing the body components toward one another. Such arrangement would not result from the combination proposed in the Office Action.

Accordingly, claim 7 is patentably distinguishable over the Spieth and Goddin patents. None of the other cited patents cure these deficiencies.

Claims 8-12, being dependent upon claim 7, are also allowable for the above reasons. Moreover, these dependent claims recite additional features further distinguishing them over the cited patents. Specifically, the arrangement of the set screws in claim 8, the second body component recesses and set screw heads of claim 9, the flush arrangement of the end surfaces of the set screw heads relative to the second body front surface of claim 10, the set screws bearing

on the second body component and threadedly engaged in the first body component of claim 11, and the threaded engagement of the first and second body components with an externally threaded portion of the spindle of claim 12, are not anticipated or rendered obvious by the cited patents, particularly within the overall claimed combinations.

In view of the foregoing, claims 7-12 are allowable. Prompt and favorable action is solicited.

Respectfully submitted,

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